YELLOWSTONE'S ENVIRONMENTAL MANAGEMENT TEAM

GREENSTONE

QUARTERLY NEWSLETTER

VOLUME 2, ISSUE 2 OCTOBER 28, 2010

A GREEN LEEDERSHIP SUCCESS AT OLD FAITHFUL

Aug. 25, 2010— Yellowstone opened its first Gold LEED (Leadership in Energy and Environmental Design) certified building, the Old Faithful Visitor Education Center. Developed by the U.S. Green Building Council, LEED certification is based upon points awarded for innovation and design; building location and construction; water conservation; conserving energy and keeping air clean; using and conserving sustainable materials; indoor air quality; and educational components. Visitor center exhibits in the lobby, bathrooms, and outside share environmentally friendly features of the building with visitors. Here are some of those features:

- Over 99% (4,800 tons) of the construction waste has been recycled. For example, concrete from the old visitor center was crushed on-site and used as backfill.
- Many building materials contain a high percentage of recycled material.
- Native landscaping relies on rain and snow, not irrigation, for moisture.
- Restrooms use low-flow toilets and faucets with *(cont. pg. 2)*

New Old Faithful Visitor Education Center

GIBBON RIVER GOES GREEN WITH GARBAGE

You emptied coffee grounds into the waste basket and threw out a wood pallet from a construction project, not expecting to see that garbage again nor perhaps realizing that Yellowstone's garbage is hauled to the West Yellowstone Compost Facility. Did you know, nearly 2/3 of Yellowstone's waste is readily compostable? That's the form Yellowstone's garbage returned to the park this summer as 3,500 cubic yards of friable, organic matter – compost!

As part of the Madison to Norris road construction project, 1.9 miles of pavement were removed from an area of unstable slopes and mud slides in the Gibbon River Canyon. Old road fill material was removed and areas reshaped to allow the river to return to its natural course. Vegetation needed to be planted to maintain these freshly exposed slopes and river banks. In order for slope stabilizing plants to grow and establish deep root systems, *(cont. pg 2)*

SPECIAL POINTS OF INTEREST:

- *Gold LEED Certification for Old Faithful Visitor Education Center.*
- *Garbage turned compost restores Gibbon River Corridor.*
- *Micro-hydro electricity will offset 670 tons of carbon dioxide produced in YELL annually.*
- *Interns spill stories of their summer of work and play in Yellowstone.*

INSIDE THIS ISSUE:

OFVEC LEED DESIGN (FROM PG. 1)

LEED certification is based upon points awarded for innovation and design; building location and construction; water conservation; conserving energy and keeping air clean; using and conserving sustainable materials; indoor air quality; and educational components.

infrared sensors.

- The building will use approximately 1/3 less energy than other structures of similar size and function.
- The foundation is shallow to protect the underground hydrothermal systems.
- Outdoor air circulates through the building 30% more efficiently than in buildings of similar size and use.

The new visitor education center is a recent example of how the park has worked with park partners to promote sound environmental stewardship. The Yellowstone Park Foundation raised $15 million of the approximately $27 million needed to design and construct the OFVEC. Exciting, interactive exhibits are housed in a building designed and built to achieve high standards of sustainability, accessibility, and aesthetics.

For more information about the OFVEC and LEED certification, refer to the *Old Faithful Visitor Education Center* supplemental insert from the Summer 2010 *Yellowstone Today* park newspaper, *Yellowstone Resources & Issues* handbook, or these websites: www.nps.gov/yell, www.ypf.org, and www.usgbc.org.

GIBBON GOES GREEN WITH GARBAGE (FROM PG. 1)

compost was mixed with the subsoil at a 1:3 rate and then spread approximately 5" deep on the slopes.

Once the compost mixture was spread, a 1" layer of topsoil (previously stripped from the project site) was placed on top of the compost mix. Logs and boulders were set in place to create shade and microclimates for plants and seedlings and then fibrous mulch was placed, about 1/2" deep, on the slopes. On top of this, a brush blanket was arranged to further reduce erosion.

Three hundred pounds of seed, collected within a 3 mile radius of the site, was sown over the entire project, including Gibbon Falls Overlook and three picnic areas. Over 21,000 native plants, grown from locally collected seed, were planted on the entire project. 17,222 of those were wetland species, such as rushes and sedges, to stabilize the river edges. The goal of this process (removing the road, adding compost, mulch, seed and plants), is not only to stabilize the slopes but also to preserve areas of thermal wetlands and rare plants along a naturally flowing Gibbon River (*more pics pg. 4).*

Montana Conservation Corps using compost and local seeds to restore Gibbon River Corridor.

A Pelton wheel is the heart of the micro-hydro project. It rotates as water fills each bucket, which spins mechanics in a generator and creates electricity.
Image from Wikipedia Commons.

A CENTURY LATER HYDROPOWER RETURNS

Yellowstone Park managers "preserve and protect" our world's first national park. Through the American Recovery and Reinvestment Act (ARRA), Yellowstone will take a big step in reducing greenhouse gas emissions by using sustainable energy sources, like micro-hydro power. A micro-hydro plant is a small scale electric plant that uses flowing water to generate energy.

Yellowstone has a long history of using alternative energy. The army constructed Mammoth's first hydro-power plant that supplied electricity to residents, administrative offices, maintenance shops, and the Mammoth Hot Spring Hotel beginning in 1903. It even powered picture shows on Thursday evenings to great attendance! With more troops stationed here, a larger hydro power plant was completed in 1911. Electricity was free to residents and the army sold excess energy to concessionaires. Over time, power use requirements increased and eventually managers switched from the *(cont. pg 3)*

MICRO-HYDRO RETURNS (FROM PG. 2)

hydropower system to commercial power for Yellowstone's electrical needs. By 1966, the plant closed.

After nearly 50 years, NPS managers are returning to green energy sources as a way to mitigate greenhouse gas emissions emitted from parks. Through hydropower and other green energy sources, administrators plan to reduce Yellowstone's greenhouse gas emissions 15% by 2016. Annually, it will offset 670 tons of carbon dioxide emissions produced in the park. The Mammoth micro-hydro plant will use water already diverted for domestic use and will produce more than 900,000 kilowatt hours (kWh) of on-site electricity annually. Since groundbreaking spring 2010, construction is well underway. The powerhouse is nearly constructed, the waterlines to and from the powerhouse are complete, and at the end of October, the turbine-generator will be delivered. As the heart of the system, the equipment has the potential to increase electrical output by 60%. That's enough to power 75 homes! The entire project should be on board by January 2011.

Gee Wiz!

On average in the southeast of the United States, a home consumes 1,100 kWh of electricity per month. Mammoth's hydro-electric power plant will:

- Produce 75,000 kWh/month and power up to 75 homes annually.
- Offset 670 tons of carbon dioxide emissions produced in the park annually.
- Save $80,000 annually on energy spending.
- Reduce our dependence on coal-fired power.

Construction is underway for the micro-hydro powerhouse.

Construction on Mammoth Micro-Hydro Power Plant

THE MAMMOTH MICRO-HYDRO PLANT WILL PRODUCE MORE THAN 900,000 KILOWATT HOURS (KWH) OF ON-SITE ELECTRICITY ANNUALLY.

"WHAT WE DID ON OUR SUMMER VACATION..."

… They came and volunteered in Yellowstone! Three interns came and assisted the EMT on environmental assessments and communication projects. In addition, one professor came to conduct energy audits. Let's hear about their summer in Yellowstone:

John Allison: I am attending the Georgia Institute of Technology as a B.S./M.S candidate in civil engineering with a concentration in water resources and hydraulics.

While in Yellowstone, I spent most of my time working on a micro-hydro feasibility study for electricity generation at Lamar Buffalo Ranch. I also worked on micro-hydro feasibility studies in the Greater Yellowstone Area, including at Red Rocks National Wildlife Refuge. In addition to working on micro-hydro studies, I worked closely with Yellowstone's Environmental Management Team (EMT) to research sustainable construction practices, and ways to meet waste reduction and energy *(cont. pg. 4)*

John Allison hiking Electric Peak

SUMMER VACATION INTERNSHIPS (FROM PG 3)

consumption goals. In my spare time, I hiked many of the trails in the northern part of the park, including a 20-mile trek up the 10,969 ft. Electric Peak.

Matt Wren: I recently graduated with a M.S. in Building Construction, with a focus on sustainable and energy-efficient buildings, from Georgia Tech. Since then, I've been working for Georgia Tech on building assessments and recommending projects to reduce electricity consumption and energy costs in existing buildings. I came to Yellowstone for the summer to work on building energy efficiency studies and to help with other projects with the EMT. I conducted building energy assessments of the YCC Camp and two sites with historic buildings in Red Lodge. I also helped John Allison record stream flow rates for micro-hydro feasibility studies for electricity generation at Lamar Buffalo Ranch.

I am extremely grateful for the opportunity I had to work in Yellowstone. Everyone helped us have a great time and shared a true passion for sustainability. For fun, I enjoyed hanging out with new friends, mountain biking, learning to fly fish, hiking, and touring Yellowstone. Thanks for such a great opportunity!

Matt Wren *(right)* enjoying Grand Teton National Park

Peter Bahrenburg: I am a student at the University of Vermont and came to Yellowstone as an SCA Intern. In Yellowstone, I worked on projects like researching designs for park-wide recycling signs and ways to have NPS employees donate used clothing to a non-profit. I also drafted articles for the EMT's *Greenstone* and monthly eHints. In addition, I helped John Allison collect data for micro-hydro feasibility studies. The most gratifying part of my internship was being an active member of the EMT.

Peter Bahrenburg fly fishing

After spending a summer working with NPS employees and fly fishing in the best rivers in the country, a piece of my heart will forever remain here. Whatever career awaits me, I will be sure to remember the unspoiled parts of the West and the importance of being a steward of the land.

Andy Hoffman: I am the Holcim professor of Sustainable Enterprise at the University of Michigan. In September, 2010 I spent three weeks at Yellowstone National Park developing the groundwork and measurement protocol for a Masters Student Project to both (a) prioritize energy efficiency/greenhouse gas reduction projects, and (b) benchmark existing energy use and green house gas emissions for determining the environmental, social and economic benefit of any future projects.

Andy Hoffman inspiring students [to conduct research in Yellowstone]

"I AM EXTREMELY GRATEFUL FOR THE OPPORTUNITY TO WORK IN YELLOWSTONE. EVERYONE HELPED US HAVE A GREAT TIME AND SHARED A TRUE PASSION FOR SUSTAINABILITY."
-MATT WREN, INTERN

Gibbon Greening

See story pp. 1-2 for garbage greening of the Gibbon.

Brush blanket helping prevent erosion and stabilize plant growth along Gibbon River corridor.

Dan Rhodes, NPS Landscape Architect, uses green transportation on the Gibbon River Project (see pp. 1-2)

YELLOWSTONE'S ENVIRONMENTAL MANAGEMENT TEAM

Bernie Adams, Lynn Chan, Jennifer Conrad, Jim Evanoff, Andy Fox, Kevin Franken, Lori Gruber, Bianca Klein, Lloyd Krueger, Nancy Patterson

Consultants

Kevin Caravati, Steve Iobst, Glenn Plumb, Lindsay Robb

Chief of Maintenance Office
PO Box 168
Yellowstone National Park
WY 82190

E-mail:
YELL_Environmental_Management_Team@nps.gov

FIND US ONLINE!

WWW.YELL.NPS.GOV/YEP

Greenstone Prepared By:

Nancy Patterson, Lori Gruber, & Jennifer Conrad

National Park Service Mission Statement

"…the [National Park] Service thus established shall promote and regulate the use of Federal areas known as national parks, monuments, and reservations which purpose is to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations."

- NPS Organic Act, 1916.

YELLOWSTONE AND GRAND TETON GREEN TEAMS UNITE!

Sept. 2010 –Grand Teton and Yellowstone National Parks' Green Teams met at Old Faithful Visitor Education Center and learned about green design and LEED with interpretation staff. Did you know the building was uniquely designed to have minimal environmental impact? The teams then talked about green projects and ways to collaborate. Here are meeting highlights:

- YELL is developing alternative energy sources like micro-hydro electricity projects.
- GRTE buys $30,000 of green power for the park annually.
- Both parks are developing (or have) messages about decreasing idling in the parks.
- GRTE calculated permanent employees commute 700,000 miles and seasonals commute 300,000 miles per year to get to work.
- YELL is installing water filling stations in stores. GRTE is phasing out plastic bottles in favor of refillable bottles.
- Zero-waste kits are chic! GRTE has zero-waste kits for park events to reduce waste. Have you started planning for your sustainable parties? YELL wants to work on zero-waste parties; remember to bring reusable flatware to parties!

We also toured the West Yellowstone Compost Facility. This reminded us how important it is to properly sort garbage. People hadn't sorted recyclables, and those go to the landfill once at the Compost Facility! Fortunately, there was also plenty of organic waste to turn into compost. Moral to the story: sort your recycling to keep it from the landfill! Place organic waste in clear bags so it becomes compost! Bulky items go in roll-off bins. Constant vigilance helps reduce waste to the landfill!

"I thought it was a great meeting and look forward to our continued partnership with Yellowstone."

Margaret Wilson, Planner
Grand Teton National Park